## *THE SOUTH-AFRICAN MUSEUM*

SINCE we last gave a notice of this institution we have learned, with much pleasure, that the Cape Government has made liberal provision for its more efficient administration and maintenance. There is none of the more important British Colonies which has of late made more rapid progress than the Cape in material prosperity, and it is most gratifying to find that the Molteno administration (the first ministry organised under the Parliamentary System of Government initiated in 1872) has not been oblivious of the claims of science during its four years' tenure of office. In the estimates for the financial year 1876–77, as passed by the Colonial Legislature, we find provision made for Botanical Gardens to the extent of 2,900*l.*; for Public Libraries, 2,600*l.*; for Museums, 1,300*l*; while such items as "Geological Researches, 1,500*l.*;" "In aid of publishing Dr. Bleek's Bushman Researches, 200*l.*;" and "Meteorological Commission, 250*l.*," sufficiently prove that the duty of endowing research is practically recognised by the Cape authorities. The present able Governor, Sir Henry Barkley, F.R.S., is as well and widely known for his attachment to scientific pursuits as for his distinction in Colonial administration, and we think we cannot err in tracing to his judicious influence much of the enlightened action of his responsible advisers in their recommendations to the Parliament.

The South-African Museum is located in Cape Town, and is the public museum of the Colony. It was instituted in 1855 under the auspices of Sir George Grey, a governor distinguished for his energy and success in initiating measures for awakening and developing the intellectual life of the Colony. Many years before there had existed a South-African Museum in Cape Town, consisting of the combined collections formed by the Expedition for Exploring the Interior, under the superintendence of the celebrated zoologist, Sir Andrew Smith, and by M. Verreaux; but this museum was devoid of means for permanent maintenance, and after languishing for a while came to an untimely end for want of public support. Many of its finest specimens, however—and notably those of the magnificent larger mammals characteristic of the region which constituted its chief ornament—were fortunately secured for the British Museum, and still form an imposing feature of the national collection. The new, or present institution, was started by public subscription aided by an annual grant from the Government of 300*l.* Two trustees were appointed by the Governor, and a third elected annually by the subscribers; but in 1857 the collections already brought together were of sufficient importance to induce the passing of an "Act to Incorporate the South-African Museum," under which all the three trustees were to be appointed by the Governor, and to be vested with full powers for the entire management and control of the institution. Under this Act the Museum has continued to be and is still administered.

In happy contrast to the untoward fate of too many kindred institutions, the South-African Museum has from the first been most fortunate in the possession of trustees who were men of culture and of scientific attainments; and for fifteen years it enjoyed the further advantage of the services of Mr. E. L. Layard, C.M.G. (now H.M. Consul in New Caledonia), as its Curator.

The usual difficulties attended the acquisition of suitable premises for the Museum, but these were eventually obviated by the erection at the cost of the public of a building expressly designed for the purpose; and on April 5, 1860, the Museum was opened to the public in its new quarters.

As mentioned in our notice already referred to, the Cape Museum appears, notwithstanding the advantages stated, to have suffered from the chronic complaint of very insufficient funds. The system of support partly from the Colonial Treasury, and partly from private subscriptions, seems to have failed, the subscribers lost by death or departure from the Colony not being as a rule replaced by others; and of late years the institution depended almost wholly on the government subsidy of 300*l.* With such limited means at their disposal, it was obviously out of the question for the Trustees to award an adequate remuneration to the Curator, and they had no alternative but to make shift with engaging the services of a gentleman willing to devote a part of his time to the Museum. This unsatisfactory state of things has now been remedied by the government on the recommendation of the Trustees, constituting the Curatorship a Civil Service appointment, with a suitable salary. We congratulate Mr. Trimen—who has been for four years endeavouring to satisfy simultaneously the rival claims on his attention of an ordinary public office, and of a museum of natural history—upon his appointment to the Curatorship on its improved basis; and we consider that great credit attaches to the Cape Government for effecting so desirable a reform. We must not omit to mention, moreover, that, under further legislative provision, a new gallery has just been erected in the Museum, and other much-needed repairs and improvements in course of execution are approaching completion.

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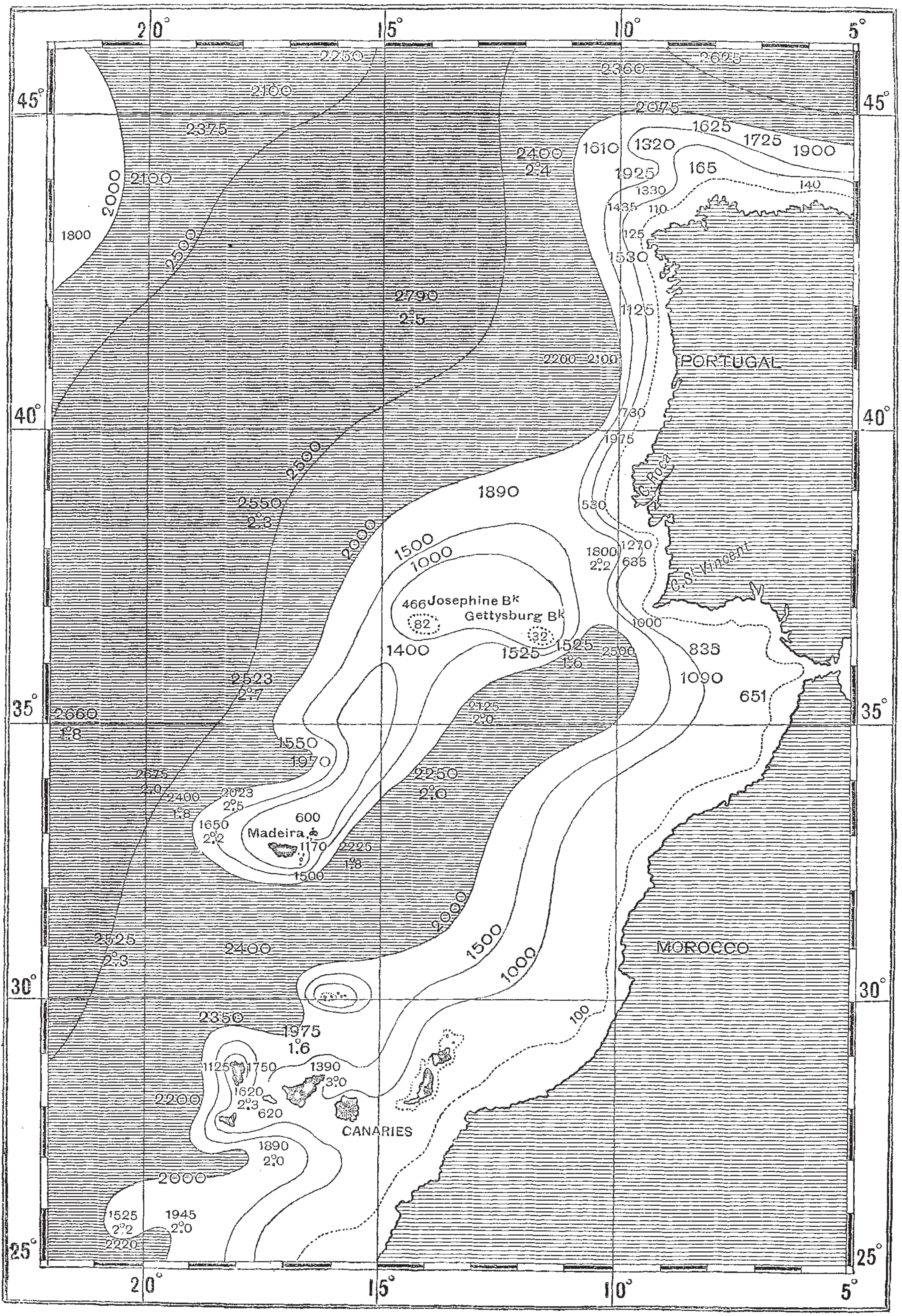
## *ATLANTIC SOUNDINGS*

THE recently-announced discovery by Commander Gorringe, of the United States sloop *Gettysburg*, of a bank of soundings bearing N. 85° W., and distant 130 miles from Cape St. Vincent, during the last voyage of the vessel across the Atlantic, taken in combination with previous soundings obtained in the same region of the North Atlantic, suggests the probable existence of a submarine ridge or plateau connecting the island of Madeira with the coast of Portugal, and the possible subaerial connection in prehistoric times of that island with the south-western extremity of Europe. The soundings obtained in January, 1873, by H.M.S. *Challenger*, and in July, 1874, by the German frigate *Gazelle*, furnish additional data, with the help of which the accompanying contour-chart has been constructed.

These soundings reveal the existence of a channel of an average depth of from 2,000 to 2,500 fathoms, extending in a north-easterly direction from its entrance between Madeira and the Canary Islands towards Cape St. Vincent. It is bounded on the west and north by the submarine ridge which unites Madeira with the Josephine bank and the recently-discovered Gettysburg bank, on the east by the coasts of Portugal and Morocco, and on the south by the submarine plateau which connects the Canary Islands with the African continent.

As shown in the chart, this channel is virtually an extension or branch of the still deeper channel which runs up between Madeira and the Azores. The island of Madeira, with the adjacent islands of the Dezertas and Porto Santo, occupies the southern extremity of the dividing ridge, and marks the junction of the two channels. Confined by a comparatively steep bank on the west and a more gentle slope towards the African shore, this eastern branch seems to attain its greatest depth off Cape St. Vincent, after which it contracts into a narrower channel, less than 2,000 fathoms deep, and continuing northwards as far as the latitude of Cape Roca, it once more joins the vast abysses of the Atlantic. The Strait of Gibraltar is undoubtedly a recently-formed connecting-link between this basin and that of the Mediterranean.

Commander Gorringe, when about 150 miles from the Strait of Gibraltar, found that the soundings decreased from 2,700 fathoms to 1,600 fathoms in the distance of a few miles. The subsequent soundings, five miles apart, gave 900, 500, 400, and 100 fathoms, and eventually a depth of 32 fathoms was obtained, in which the vessel anchored. The bottom was found to consist of live pink


20°
15°
10°
5°
45°
40°
35°
30°
25°
PORTUGAL
C. Roca
C. St Vincent
MOROCCO
Josephine Bk
Gettysburg Bk
Madeira
CANARIES
2250
2100
2375
2100
2000
1800
2500
2360
2625
2075
1625
1725
1900
1610
1320
1925
165
140
1330
110
1435
125
1530
1125
2400
2·4
2790
2·5
2200
2100
730
1975
1890
530
2550
2·3
2000
1500
1000
1800
2·2
1270
685
466
82
32
1000
1400
1525
1525
1·6
2500
835
1090
651
2523
2·7
2660
1·8
2125
2·0
1550
1970
2575
2·0
2400
1·8
2023
2·5
2250
2·0
600
1650
2·2
1170
2225
1·8
1500
2000
1500
1000
2525
2·3
2400
100
2350
1975
1·6
1125
1750
1390
3·0
1620
2·3
620
2200
1890
2·0
2000
1525
2·2
1945
2·0
2220

coral, and the position of the bank in lat. 36° 29′ N., long. 11° 33′ W. In other words, Commander Gorringe, on his journey westward from the Strait, after passing over the northern extremity of the deep channel, sounded up the steep slope of the submarine plateau which connects Portugal with Madeira, and within a short distance of a sounding of 1,525 fathoms obtained by H.M.S. *Challenger* on January 30, 1873, in lat. 36° 23′ N., long. 11° 18′ W.

The sketch-map does not pretend to be more than an approximation founded upon the still limited number of soundings obtained up to this date, but the bottom-temperatures observed in this part of the North Atlantic tend to corroborate the views which I have ventured to express. They show that the submarine flow of cold water of antarctic origin, which has been traced as far north as the Bay of Biscay, also fills up the lower depths of the channel which stretches up towards Cape St. Vincent. On the other hand, the channel between the coast of Portugal and the Gettysburg Bank is occupied by the warm water of the Gulf Stream return-current, which, spreading itself out over the banks to westward, explains the presence of the live coral found by Commander Gorringe.

JOHN JAMES WILD

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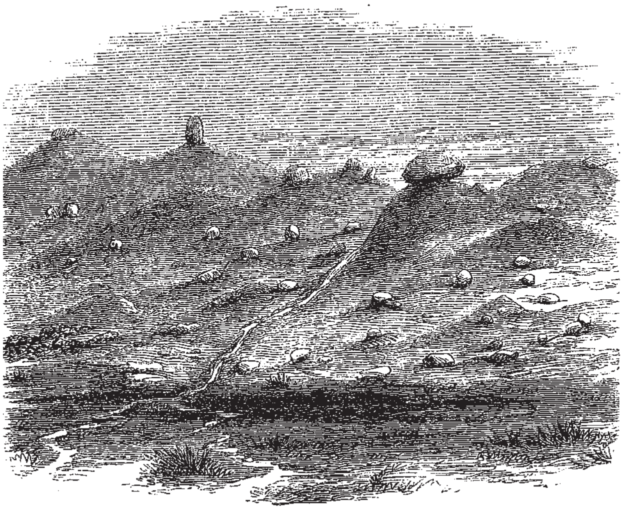
## HUMMOCKY MORAINE DRIFT

DURING his survey of the West Pacific slopes, Clarence King found and has since described, hummocks of moraine drift on the "dying-out glaciers," which are somewhat similar to the "hog-wallows;" and J. le Conte has described dying-out glaciers and moraine drifts of California. Abstracts of these descriptions will be found in the *American Journal of Science and Arts*, and the full description of the West Pacific slopes in Clarence King's report. In West Galway, Ireland, there are in places large tracts of drift sometimes like Clarence King's description, in others like the "hog-wallow;" that in the Memoirs of the Irish branch of the Geological Survey have been described as "rocky moraine drift." The accompanying sketch is of some of these drift hummocks on the north slope of Croagh-na-Cloosh, south of Oughterard.


Perched Erratic Blocks on Croagh-na-Cloosh.

G. H. KINAHAN

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## CONTRACTION OF THE LEAF OF "DIONÆA MUSCIPULA"[1]

IN the first section of this paper the authors give an account of the mechanical effects which ensue on exciting the sensitive hairs of the Dionæa leaf. The following is a *résumé* of the principal conclusions at which the authors have arrived:—

If the sensitive hair of a vigorous leaf be touched with very great care by a camel-hair pencil, no visible effect on the leaf will be produced, and a similar gentle contact can be repeated several times before the leaf begins to answer to the excitation by any movement. Sooner or later, however, the marginal hairs bend inwards and the lobes slightly approach each other. The first effectual excitation is followed by an almost imperceptible movement; after this each successive approach of the lobes in nearly every case exceeds that of its predecessor. The interval which elapses between excitation and effect diminishes as the extent of the effect increases, both facts having the same meaning, namely that in the plant, as in certain cases well known to the animal physiologist, inadequate excitations, when repeated, exercise their influence by what has been termed "summation," and thus the last contraction, that by which the leaf closes, is the result of the summation of the excitation which immediately preceded it with all the previous excitations. After the leaf has closed it still contracts at each excitation, and attempts to clench itself with greater and greater force. The interval between an excitation and the resulting movement varies from two to ten seconds.

The authors next proceed to a consideration of the electrical condition of the leaf in an unexcited state, which has recently been made the subject of a minute investigation[1] by Prof. Munk, of Berlin, who has found—1. That if we conceive the external surface of the leaf divided into strips by parallel lines crossing the midrib nearly at right angles, and coinciding with the veining, any point of the external surface of each strip is negative to any point nearer the midrib. 2. That in comparing different points of the midrib with each other, there is one whose position is two-thirds of the distance from the near to the far end of the midrib, which is positive to the rest. 3. He has further stated that the potential of any point on the internal surface of the lobe is exactly equal to that of the corresponding and opposite point on the external surface. Of these three proportions the first two are confirmed, in the main, by the authors of the present paper; as regards normal leaves, however, they take exception to his conclusions on the two under-mentioned points—(*a*) That although there is a spot of greatest positivity on the midrib, more or less corresponding in position to that mentioned by Prof. Munk, yet its position is by no means so definite as Prof. Munk states, but varies in different leaves. (*b*) That the different points in his isoelectrical negative line are never found to be absolutely identical. From the third proposition the authors generally express their dissent. They, however, content themselves for the present with stating two general conclusions—1. That the part of the midrib which lies nearest the two central sensitive hairs is positive to every other part of the external surface of the leaf, but has usually the same potential as the petiole and other inactive parts of the plant. 2. That the external surface, so long as the leaf is in vigour, is always positive to the internal surface.

The method used in this research differs from that generally employed in previous investigations, relating to animal or plant electricity, in two important particulars:—1. In the adoption of Lippmann's electrometer[2] (which has already been used by Prof. Marey in investigations on animal electricity) as the instrument for observing the electrical changes. 2. In the substitution of a constant for a variable potential as a standard of comparison with the potential under investigation.

In comparing the potentials of two points the following arrangement was usually adopted:—The pot containing the plant[3] had been previously kept plunged in water. Three non-polarisable electrodes were used, by one of them (the "fixed electrode") the damp surface of the pot is connected with the gas-pipes of the building, the other two ("movable electrodes") are in contact with the two points under observation. By means of a switch, either of these two movable electrodes can be brought into connection with one end of the electrometer, the other end being connected with earth.

When the whole of the outer surface of a leaf is covered with a mass of kaolin, moistened with salt-solution, and brought into connection with one end of the electrometer, the other end being connected by means of the fixed electrode with the petiole or pot, the effect of exciting a sensitive hair is to produce an

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[1] Abstract of paper on the Mechanical Effects and on the Electrical Disturbance consequent on Excitation of the leaf of *Dionæa muscipula*, by J. Burdon-Sanderson, M.D., F.R.S., Professor of Physiology in University College, and F. J. M. Page, B.Sc., F.C.S. Read before the Royal Society, December 14, 1876.

[1] Reichert's and du Bois-Reymond's Archiv, 1876.

[2] See the original paper, or Lippman, *Pogg. Ann.*, 1873, **149**, 546.

[3] Most of the observations were made at Kew in the month of August, 1876, the plants being obtained from the Royal Gardens, through the kindness of the Director.